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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,950	09/22/2003	James T. Yeh	S-99117	5724

31970 7590 10/20/2005

UNITED STATES DEPARTMENT OF ENERGY  
1000 INDEPENDENCE AVENUE, S.W.  
ATTN: GC-62 (CHI), MS 6F-067  
WASHINGTON, DC 20585-0162

EXAMINER

NGUYEN, NGOC YEN M

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 10/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/664,950

Applicant(s)

YEH ET AL.

Examiner

Ngoc-Yen M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 10-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 10-17 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_.

### DETAILED ACTION

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-9 are, drawn to a process removing acid anhydrides from flue gases, classified in class 423, subclass 210+.
- II. Claims 10-17 are, drawn to a device for the direct removal of acid anhydrides, classified in class 422, subclass 129+.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process such as a process for removing the anhydride by using sodium hydroxide.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Mark LaMarre on March 15, 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-9. Affirmation of this election must be made by applicant in replying to this

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Office action. Claims 10-17 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Izutsu et al (6,355,084) in view of Hammer et al (6,759,022) and the admitted prior art on page 4, paragraph [0013].

Izutsu '084 discloses a process for producing a fertilizer from gas containing sulfur dioxides, comprising:

- injecting ammonia into said gas;
- irradiating said gas with an electron beam; and
- collecting a product (note claim 1).

Izutsu '084 discloses that the flue gas can be for example fossil fuel combustion flue gas (note column 1, lines 48-55).

SO<sub>2</sub> which is a primary component of sulfur oxides contained in fossil fuel combustion flue gas or the like, is oxidized very quickly into SO<sub>3</sub> by active components including O radicals, OH radicals and the like generated from oxygen molecules or water molecules in the gas when irradiated with the electron beam. This SO<sub>3</sub> reacts with ammonia to produce sulfamic acid or with water to produce sulfuric acid (note column 1, line 62 to column 2, line 14).

Izutsu '084 further discloses that flue gas also contains nitrogen oxides and the flue gas is cooled to 150°C by a heat exchanger, then cooled to 60°C by a water spray cooling tower (note column 8, lines 47-67). The water spray cooling tower would inherently remove any particulate matter from the flue gases.

The differences are Izutsu '084 does not disclose that (1) the nitrogen oxides are also oxidized by the electron beam and (2) the flue gas contains other acid moieties beside sulfur oxides and nitrogen oxides.

For (1), the admitted prior art on page 4 (paragraph [0013]) is applied to teach that the flue gas-ammonia mixture is subjected to beams of high energy electrons, the nitrogen oxides are also oxidized, same as sulfur oxides.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to reasonably expect that the nitrogen oxides in the flue gas of Izutsu '084 to also be oxidized by the electron beam as evidenced by the admitted prior art (paragraph [0013]).

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For (2), Hammer '022 teaches that the conventional flue gas obtained from burning fossil fuels contains acidic gases, such as sulfur dioxide, hydrogen chloride and/or hydrogen fluoride, as well as particulate matter and nitrogen oxide (note column 3, lines 5-13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the process of Izutsu '084 to remove sulfur oxides and nitrogen oxides from a flue gas containing hydrogen chloride and hydrogen fluoride in addition to the above mentioned oxides because Hammer '022 teaches that these acid gas contaminants are conventional in the art and removal of the oxides is desired.

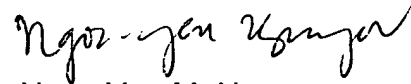
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Stan Silverman can be reached on (571) 272-1358. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed (571) 272-1700.



Ngoc-Yen M. Nguyen  
Primary Examiner  
Art Unit 1754

nmn  
October 17, 2005